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ARTICLE



How does mentoring by teachers improve the adjustment of academically at-risk students in high school?

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ABSTRACT

The aims of this study were twofold: to describe associations between mentoring relationship quality (MRQ) and student academic adjustment in a formal mentoring program involving teachers as mentors and academically at-risk students as mentees, and to explore the mediating and moderating effects of student mastery goal orientation on these associations. One hundred and fifteen academically at-risk students in their first year of high school (mean age = 13.46, $SD = 0.80$) participated in ACCES, a one-year academic teacher–student mentoring program. Student academic adjustment and mastery goal orientation were assessed at the beginning (September) and end (June) of the program and MRQ was measured at the last mentoring meeting (May). Multiple linear regression analysis showed that teacher–student MRQ positively predicted changes in academic adjustment, particularly when at-risk students showed weak mastery goal orientation at program entry (i.e., compensatory effect). Structural equation analysis showed no mediating effect of mastery goal orientation on associations between MRQ and academic adjustment. Implications for academic mentoring practices by teachers are discussed.

KEYWORDS

mastery goal orientation; academic mentoring; academically at-risk students; teacher mentor; motivation; prevention; academic adjustment; youth

Teacher mentoring overview

In the past decade, various mentoring programs with teachers acting as mentors have been implemented in high schools to improve the academic adjustment of at-risk students (e.g., Laco & Johnson, 2017). Although some studies have found positive associations between this type of formal mentoring and various indicators of academic functioning (Fruht & Wray-Lake, 2013; Gastic & Johnson, 2009; Holt, Bry, & Johnson, 2008), none has sought to identify the mechanisms at play in these associations. A systematic examination of these mechanisms could enrich our understanding of mentoring by teachers, identify profiles of at-risk students who respond positively to this type of intervention, and ultimately raise the quality and effectiveness of mentoring programs (DuBois & Rhodes, 2006; Fruht & Wray-Lake, 2013; Laco & Johnson, 2017).

The present study was conducted to better capture the role of teachers who mentor academically at-risk students during the elementary-to-high-school transition. It also aimed to understand how they can prevent the adjustment difficulties of most at-risk students. Data came from a large evaluation of the program *Accompagnement par des Enseignants du Secondaire*

(Mentoring by Teachers in High School, or ACCES; Larose & Duchesne, *in press*) that was funded by the Social Sciences and Humanities Research Council of Canada. The ACCES program was developed by our research team and implemented for the first time in year 2012–2013 at 15 high schools in Québec City, Canada, in order to prevent high school dropout. Thirty volunteer teachers were trained and supervised by a psychoeducator to mentor 115 academically at-risk students (i.e., presented academic delays in elementary school and had received individualized intervention for severe behavioral problems). The main objective of ACCES was to help at-risk students adapt to the transition by strengthening their feelings of efficacy, motivation, and academic perseverance. The teacher-mentors were encouraged to build a positive working alliance with their mentees (i.e., bonding and goal agreement) and to help them develop mastery goals for learning. The evaluation process of the program included a baseline (before the implementation), a postmentoring assessment (at the last mentoring meeting), a posttest (after one school year), and three follow-ups (1, 2, and 4 years after the posttest).

The present article uses the baseline, postmentoring, and posttest data and explores the specific role played

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by the mastery goals of academically at-risk students in the mentoring relationship they developed throughout the ACCES program. In the next sections, we review recent works on mentoring, focusing on those that have examined the effects and operating mechanisms of programs involving teachers and academically at-risk students. We present the achievement goals theory along with relevant studies on the determinants and effects of student mastery goal orientation. Based on the literature on mentoring and achievement goals, we propose that the adoption of mastery goals by at-risk students would mediate or moderate the associations between Mentoring Relationship Quality (MRQ) and their academic adjustment.

Formal mentoring and student academic adjustment

Formal youth mentoring refers to a structured program in which a volunteer adult or peer (the mentor) provides emotional, academic, and social support to a youth with specific adaptation needs (the mentee; DuBois & Karcher, 2014). Studies on the effects and mechanisms of formal youth mentoring have multiplied over the past two decades. Various meta-analyses have shown that formal mentoring generates positive but modest effects on mentee academic functioning, including academic efficacy, academic motivation, and intentions to persevere at school (DuBois, Portillo, Rhodes, Silverthorn, & Valentine, 2011; Eby, Allen, Evans, Ng, & DuBois, 2008; Wood & Mayo-Wilson, 2012). These meta-analyses also suggest that the effectiveness of formal mentoring depends on a number of organizational and personal factors, such as the provision and quality of mentor training, mentor–mentee matching based on common interests, the duration and quality of the mentoring relationship, and certain characteristics of mentors and mentees, for example, having a background in the helping professions (for mentors) and having behavioral problems (for mentees; DuBois et al., 2011; Eby et al., 2008; Wood & Mayo-Wilson, 2012).

Mentoring programs are implemented in various contexts, for instance, the community, schools, or the workplace. When mentoring is served by school staff members (e.g., teacher, preservice teacher, retiree) and offered to academically at-risk students (e.g., with low grades), it is usually qualified as formal academic mentoring (Jacobi, 1991; Larose & Tarabulsy, 2014; Radcliffe & Bos, 2011). This specific type of mentoring typically occurs in high schools and postsecondary schools and includes teaching, supervision, and school socialization functions. In line with the apprentice

model, teachers and educators in formal academic mentoring support and guide at-risk students to improve their academic (e.g., attitudes, cognitive strategies, classwork), social (e.g., relationships with friends, social acceptance), and school life (e.g., feelings of well-being at school, relationships with teachers).

Some studies have found encouraging effects of formal academic mentoring. In at-risk students, it reduces the number of disciplinary referrals in high school and improves their school connectedness (Converse & Lignugaris-Kraft, 2009), perceptions of teacher support, decision-making skills (Holt et al., 2008), cognitive engagement in class (Laco & Johnson, 2017), achievement in certain subjects, and perseverance in postsecondary studies (Campbell & Campbell, 2007; Salinitri, 2005). One study also showed that formal academic mentoring with at-risk students throughout high school, and by several teachers, improves math performance, encourages aspirations to pursue postsecondary studies, and promotes positive perceptions of the college environment (Radcliffe & Bos, 2011).

However, few empirical studies have investigated the mechanisms that explain the effects of formal academic mentoring on the academic adjustment of at-risk students. Instead, some theoretical models propose the presence of mediating and moderating processes as potential explanations. Notably, the model of youth mentoring (Rhodes, 2005) posits that a mentoring relationship characterized by empathy, mutuality, and trust predicts youth achievement and well-being through three processes, including socioemotional development (e.g., the mentee develops a positive vision of adults other than parents), identity development (e.g., the mentee internalizes the mentor's values, attitudes, and behaviors), and cognitive development (e.g., the mentee develops a self-assessment that is centered less on social comparison and more on individual learning). With respect to cognitive development, Rhodes (2005) contends that a positive mentoring relationship enriches the mentee's cognitive development through exposure to meaningful, youth-relevant conversations and through guidance to learn within Vygotsky's (1978) "zone of proximal development." Hence, in academic mentoring, learning—or the consolidation of various cognitive and motivational processes (e.g., mastery goal orientation)—could therefore *mediate* the association between mentoring quality and the academic adjustment of at-risk students.

Other mentoring models point to certain cognitive and behavioral characteristics of at-risk students as *moderators* of the effects of formal academic mentoring. Notably, the sociomotivational mentoring model (Larose & Tarabulsy, 2014) postulates that the challenge

of attaining mentoring objectives may vary as a function of mentee, mentor, or contextual characteristics. For example, the level of academic risk to which students are exposed, the difficulty for some mentees to seek help from others, and their previous dispositions in terms of cognitive and behavioral engagement (e.g., mastery goal orientation), all may be linked to the effectiveness of mentoring programs, specifically, the program's ability to affect the mentee's academic adjustment.

We now present the concept of mastery goals. We argue that this characteristic of mentees can, in an academic mentoring program, and more particularly the ACCES program, mediate and moderate the effects of the MRQ on their academic adjustment.

Achievement goal theory and research

Achievement goal theory is a framework that is widely applied in education research to explain and study the development of academic motivation (Anderman & Patrick, 2012). It posits the presence of two main types of personal goals that youth may adopt in their school work (and sometimes in their social life), and that vary in intensity: mastery (i.e., focusing on understanding and personal improvement) and performance (i.e., focusing on outperforming others). These two goals are oriented by whether the student focuses on desired outcomes (approach orientation) or undesired outcomes (avoid orientation). According to certain typologies (Elliot & McGregor, 2001), four types of goals may characterize a youth's learning orientation: mastery-approach (e.g., seeking to understand and master tasks), mastery-avoid (e.g., seeking to avoid misunderstanding), performance-approach (e.g., seeking to outperform other students), and performance-avoid (e.g., seeking to avoid performing poorly). Although some studies have validated this 2×2 model, achievement goal theory researchers have paid more attention to how mastery-approach goals are associated with teaching practices and with students' beliefs, attitudes, and socioacademic behaviors. We therefore restricted our investigation of the mediating and moderating effects to focus on mastery goals (approach orientation). In the remainder of this article, we address the determinants and presumptive effects of mastery goal orientation.

Mastery goals originate in part from how youth experience their time at school, and more particularly, in their relationships with teachers. Mastery goal orientation is said to be directly associated with a safe classroom environment that is oriented toward mastery of learning. These environments prevail when the teacher

uses consistent and coherent teaching and social practices (Anderman & Patrick, 2012; Murayama & Elliot, 2009). Ames (1992) developed the TARGET model (subsequently, TARGETS) to describe these evidence-based practices: meaningful, interesting, and challenging tasks (T); student autonomy (A) through a democratic process of shared responsibility for learning; appropriate recognition (R) for all students, focusing on specific progress and effort and not social comparison; flexible and variable grouping (G) of students, and not according to ability; evaluation (E) and feedback on what students learn rather than marking on a comparative curve; providing optimal time (T) for classwork to accommodate individual student needs; and teacher socialization (S), or respectful and supportive teacher-student relationships that promote positive socioemotional and academic outcomes.

This model has been well validated by academic motivation studies. For instance, student perceptions of a classroom mastery goal structure (i.e., classroom environment) predicted their adoption of mastery goals, which in turn mediated associations between perceptions and both behavioral engagement and motivation (Gonida, Voulala, & Kiosseoglou, 2009; Murayama & Elliot, 2009). Other studies have found direct associations between student perceptions of a classroom mastery goal structure and both adaptation and maladaptation indices such as engagement, interest, and effort in class (Lau & Nie, 2008) as well as depression, anxiety, and disruptive behaviors (Skaalvik, Federici, Wigfield, & Tangen, 2017; Stornes & Bru, 2011; Travers, Bohnert, & Randall, 2013). Based on these previous findings, and given the close relationships found between student-perceived mastery goal structure and perceived teacher support (Anderman & Patrick, 2012; Turner, Gray, Anderman, Dawson, & Anderman, 2013), we expected that mentee-perceived quality of the relationship with a TARGETS-trained teacher-mentor would predict mentee adoption of mastery goals. This hypothesis is consistent with one of the objectives of the ACCES initial training program: to inform teacher-mentors of the TARGETS intervention model and how they can transfer it to the mentoring process (see Method section).

The positive effects of mastery goals on student academic functioning have been extensively reported. We know that students who adopt mastery goals tend to believe that intelligence is malleable, and not fixed (Dweck & Leggett, 1988). Moreover, compared to students with weak mastery goals, they use effective learning and self-regulatory strategies more often (Patrick, Ryan, & Kaplan, 2007; Wolters, 2004), have more positive feelings about school (Roeser, Midgley, & Urdan,

1996), present less academic anxiety (Skaalvik, 1997), more readily seek help from teachers as needed (Duchesne, Larose, & Feng, 2017; Ryan & Pintrich, 1997), feel greater learning efficacy during school transitions (Gutman, 2006), and perform better academically, specifically when evaluations require them to demonstrate deep understanding (Anderman & Patrick, 2012; Gutman, 2006). Generally speaking, mastery goal orientation fosters autonomy and the use of effective learning strategies, which act in turn to increase motivation and academic perseverance (Duchesne et al., 2017).

The present study

In the present study, we explore the presence of mediating and moderating effects of mastery goals on the associations between teacher–student MRQ and the academic adjustment of at-risk students (in terms of academic motivation, self-efficacy, and persistence). We examine these effects as part of an ACCES program evaluation in which student academic adjustment and mastery goals were measured before and after students participated in the program (September and June of their first high school year) and MRQ at the last mentoring meeting (May). Three specific hypotheses were examined:

- (1) In line with the academic mentoring research and the ACCES program objectives, we expected that MRQ with teacher-mentors would predict positive changes in the academic adjustment of mentees and in the mastery goals they pursued during the school year.
- (2) Consistent with the premises of the model of youth mentoring, achievement goal theory, and our review of the literature on mastery goals, we expected changes in mastery goals to mediate the effects of MRQ on student academic adjustment.
- (3) Taking into account one of the core objectives of the ACCES initial training program (i.e., develop in teacher-mentors a deeper understanding of the effects of mastery goals), and consistent with the premises of the sociomotivational mentoring model, we proposed that student mastery goals at ACCES program entry would moderate the effects of MRQ on student academic adjustment. However, it was difficult to determine the direction of the moderating effect ahead of time. On the one hand, because the ACCES program trains teacher-mentors to understand mastery goals and nurture them in mentees, the mentoring influence

on academic adjustment could be stronger for students with weaker compared to stronger mastery goals at program entry (i.e., compensatory effect). On the other hand, given the strong associations reported in the literature between mastery goals and student autonomy, positive school perceptions, and effective use of teacher support (e.g., Duchesne et al., 2017; Patrick et al., 2007; Roeser et al., 1996), we also conjectured that mentoring could have an inverse moderating effect. In other words, MRQ would wield a stronger effect on academically at-risk students with high mastery goals at program entry (i.e., conditional effect). The direction of the moderating effect was therefore difficult to foretell.

Method

Mentoring program

The present study was conducted during the first implementation year of the ACCES program (Larose & Duchesne, *in press*). ACCES is a selective prevention program in which teachers volunteer to act as mentors for academically at-risk students throughout the first year of high school (i.e., 16 scheduled individual meetings from September to May). Each teacher-mentor provided mentoring to three or four students. The participating students had repeated a year in elementary school or had received individualized interventions for severe behavioral problems. The overall objective of the ACCES program is to help these students adapt well to the transition from elementary to high school by nurturing their feelings of efficacy, motivation, and academic perseverance. The teacher-mentors, who were teaching first- or second-year high school subjects, had to build a positive working alliance with their mentees (i.e., bonding and goal agreement) and help them develop mastery goals for learning. To assist them in this task, the ACCES program gave the teacher-mentors an initial day of training at the start of the school year, prior to matching them with their mentees, and a second day of training a few weeks after the mentoring meetings began. The training was conducted by a psychoeducator. During the training, teachers deepened their knowledge about the concepts of the working alliance and mastery goals, and they learned appropriate mentoring practices through case studies, videos, and exercises (see Boisclair Châteauvert, Cyrenne, Larose, & Duchesne, 2014). The training pays particular attention to the TARGETS model and

its practical implications for teaching and mentoring at-risk students. Notably, the teacher-mentors learned how to transfer the TARGETS intervention principles to individualized mentoring practices (e.g., propose meaningful tasks and activities, establish a democratic decision-making process, and offer support based on the mentee's learning progress and efforts rather than performance). The teacher-mentors used logbooks to structure their mentoring approach and ensure adherence to theoretical and program guidelines. In addition, the psychoeducator conducted five individual and group supervision sessions with the mentors during the mentorship (from November to March) to oversee the mentoring process and give the mentors opportunities to compare notes on what worked and what didn't.

Study design and procedure

In the initial implementation year (2012–2013 school year), the students in the ACCES program received eight months of intervention, including two individual meetings with the mentor per month. For the present study, we used assessment data collected from an experimental group at Time 1 and Time 3 in the first implementation year. At Time 1 (September), once the school administrators had identified the at-risk students, data were collected at the first meeting between each mentee and their teacher-mentor. The students completed a questionnaire to assess their baseline academic adjustment and mastery goals, and one parent per student responded to sociodemographic questions. At Time 3, in June of the same school year, corresponding to the completion of the ACCES program, the students responded to the same questionnaires again. Perceptions of the MRQ were assessed one month before (Time 2), immediately after the last mentoring meeting (May). Study procedures were approved by the Université Laval ethics board.

Participants

The sample for the present study comprised 115 students in their first year of high school (mean age = 13.46, $SD = 0.80$) who had repeated a year of elementary school (40.6%) or received individualized interventions for severe behavioral problems (53.6%). The majority were boys (72.4%), were born in the Québec City Region (92.3%), lived with both biological parents (51.9%), and had an annual household income below \$60,000 (50.5%).

Measures

Mentoring relationship quality

We used two subscales from the short version of the Working Alliance Inventory to assess mentee perceptions of the MRQ (Horvath & Greenberg, 1989). Each contains four items that mentees rated on a scale ranging from 1 (never) to 7 (always): (a) Goal agreement, or mutual agreement on the goals to pursue in the relationship (e.g., "We have established a good understanding of the kind of changes that would be good for me"); and (b) Bonding, or the development of a personal bond between mentor and mentee (e.g., "I believe my teacher-mentor likes me"). The construct validity of this version has been established by confirmatory factor analysis (Tracey & Kokotovic, 1989). A bilevel factor structure with a primary general alliance factor and three secondary specific factors (i.e., goals, tasks, and bonds) was found as the model that best fit the data for both clients and therapists. In Tracey and Kokotovic's (1989) study, Cronbach's alphas for both the goals and bonds subscales were .90 for clients and .83 and .88, respectively, for therapists. In the present study, mentees completed the questionnaire after their final mentoring meeting (Time 2). Adequate reliability coefficients were found (.74 and .90 for Goal agreement and Bonding, respectively).

Mastery goal orientation

Mastery goal adoption was measured using the Mastery Goal Scale of the Achievement Goal Questionnaire (Elliot & McGregor, 2001). It contains three items (e.g., "I want to learn as much as possible from my class") rated on a scale from 1 (never) to 7 (always). Cronbach's alphas at Time 1 and Time 3 were .87 and .90, respectively.

Academic adjustment

We assessed students' academic adjustment using three scales. The Échelle des Perceptions de Compétence dans les Domaines de Vie (Scale of Perceptions of Competence in Life Domains, or EPCDV; Losier, Vallerand, & Blais, 1993) assesses feelings of academic efficacy. It contains four items (e.g., "I think I'm a good student") that mentees rated on a scale from 1 (never) to 7 (always). Cronbach's alphas at Time 1 and Time 3 were .74 and .72, respectively. We measured academic motivation using three items from the Identified motivation subscale of the Elementary School Motivation Scale (Guay, Chanal, Ratelle, Marsh, Larose, & Boivin, 2010). The original scale measures academic motivation for specific subjects (i.e., reading, writing, and math). We adapted the items for the present study in order to

assess overall motivation to attend school (e.g., “Going to school will allow me to learn a lot of useful things”). Participants rated the items from 1 (not true at all) to 5 (very true). Cronbach’s alphas for the original scale varied from .60 to .88 according to student grade and subject. In the present study, Cronbach’s alphas were .84 at both Times (1 and 3). We assessed intentions to persevere at school with two items from the Future Schooling Intentions Scale (Vallerand, Fortier, & Guay, 1997). Students rated the items (e.g., “I often consider dropping out of school”—recode) from 1 (not my intention at all) to 5 (exactly my intention). Correlations between the two items were .63 at Time 1 and .72 at Time 3.

Data analysis

In the preliminary analysis, we performed descriptive statistics (frequencies, means, standard deviations, and intraclass correlations) to examine the characteristics of the sample, mentoring dose, and independence of the mentoring relationship and postexperience adjustment data. Pearson correlations were also performed to describe the associations among all study measures.

We performed the main analyses with MPlus 7.4 using full information maximum likelihood (FIML) to estimate the missing data (Peugh & Enders, 2004; Schafer & Graham, 2002). To address the moderator hypothesis, we ran hierarchical linear regression analyses to predict academic adjustment at Time 3 (i.e., academic self-efficacy, academic motivation, and perseverance intentions) from mastery goal orientation at Time 1 (step 2) and MRQ (bonding and goal agreement) at Time 2 (step 3) while controlling for academic adjustment at Time 1 (step 1). In step 4, we tested the double interaction effects (bonding \times mastery goals and goal agreement \times mastery goals) to determine conditional and compensatory effects of MRQ. Next, we decomposed the statistically significant interaction effects to determine their direction. We then tested the scores used in the equation at one and two standard deviations above and below the mean (Cohen, Cohen, West, & Aiken, 2003) and applied a decomposition procedure. Finally, we measured the simple slopes for each curve to determine whether they differed from zero (Aiken, West, & Reno, 1991).

To address the mediator hypothesis, we ran six separate structural equation modeling (SEM) analyses (one for each academic adjustment variable by each MRQ dimension) using a bootstrap procedure (Hayes & Scharkow, 2013). Each of the six models included one of the MRQ indicators at Time 2 (Bonding and Goal agreement) as the predictor variable for academic adjustment at Time 3 (i.e., academic self-efficacy,

academic motivation, and perseverance intentions), and we used mastery goal orientation at Time 3 as the mediator variable. We also included academic adjustment scores and mastery goal orientation at Time 1 as control variables. We examined indirect effects to determine the presence of a mediating effect of mastery goal orientation. CFI, RMSEA, and χ^2 statistics were reported as indices of fit and bias-corrected 95% confidence intervals were computed to test for mediation. When the confidence interval did not include zero, we concluded a mediating effect (Hayes & Scharkow, 2013). Assumptions for all statistical analyses were met.

Results

Preliminary analyses

Mentoring session attendance and dose

The teacher-mentors’ logbooks enabled compiling data on the number, length, and frequency of mentoring meetings. Average number of meetings was 13 ($SD = 3.82$), with a minimum of 5 and a maximum of 22. This is slightly below what the ACCES program prescribes (16). The majority (53%) of students had 15 or more meetings. Average meeting length was 29.76 min ($SD = 9.52$), and, as prescribed by the ACCES program, teacher-mentors met with their mentees once per 9-day cycle on average. All ($n = 30$) teacher-mentors attended 2 training days, 2 individual supervision sessions, and 3 group supervision sessions. Teacher-mentors had high perceptions of the support measures, rated on a scale from 1 (not at all useful) to 4 (very useful). Average perceived usefulness scores were 3.61 ($SD = 0.63$) for initial training, 3.46 ($SD = 0.51$) for individual supervision, 3.14 ($SD = 0.85$) for group supervision, and 3.25 ($SD = 0.84$) for logbook use.

Intraclass correlations

Because the teacher-mentors mentored more than one at-risk student (most had 4, and some had 3), mentee perceptions of the MRQ and academic adjustment after the ACCES experience could depend more on the mentor’s characteristics than the mentoring relationship. Therefore, to ensure data independence, we calculated the design effect (DEFF; McCoach & Adelson, 2010; Muthén & Muthén, 2000) using the equation $DEFF = 1 + p(\bar{n} - 1)$, where p is the intraclass correlation (ICC) and \bar{n} is the average cluster size, or the average number of students per teacher-mentor. The calculated ICCs for all variables were weak, ranging from 0.005 to 0.106, indicating data independence for students mentored by a same teacher. The subsequently calculated DEFFs ranged from 1.004 to 1.122.

Generally, a DEFF ranging from 1.00 to 2.00 is considered acceptable and sufficiently low to ignore, such that the data may be considered independent (McCoach & Adelson, 2010; Muthén & Muthén, 2000).

Descriptive statistics and associations among variables

The lower part of Table 1 presents the means and standard deviations for the main study variables. The average scores for working alliance are high (Bonding: $M = 6.19/7$; Goal agreement: $M = 5.66/7$). Of the mentees, 75% reported very positive bonding with their mentor (rated $\geq 6/7$), and 55% reported clearly agreeing with their mentor on the mentoring goals to pursue (rated $\geq 6/7$; not shown in Table 1). Overall, mastery goals and feelings of academic self-efficacy at baseline were moderate ($M = 5.48/7$ for mastery goals; $M = 4.68/7$ for academic self-efficacy), whereas academic motivation ($M = 4.51/5$) and intentions to persevere ($M = 4.66/5$) were relatively high. For instance, 33% of mentees reported that they always or almost always pursued mastery goals in their learning (rated $\geq 6/7$), and 18% reported always or almost always having high feelings of efficacy (rated $\geq 6/7$; not shown in Table 1). The percentages are much higher for motivation and intentions to persevere: 89% of mentees did not intend to quit school (rated $\geq 4/5$), and 77% said they were very motivated at school (rated $\geq 4/5$; not shown in Table 1).

The upper part of Table 1 presents the correlations between the main study variables. Consistent with the empirical research on motivational goals, mastery goals are positively associated with academic self-efficacy, academic motivation, and perseverance intentions, both transversely and longitudinally (except for one association between mastery goals at baseline and perseverance intentions post-ACCES experience, and it is statistically nonsignificant). Note that the two MRQ indicators (Bonding and Goal agreement) are also positively associated with mastery goals and the academic adjustment indicators, with generally weaker correlations for baseline compared to postexperience measures. This suggests that mentee perceptions of the MRQ were somewhat affected by academic adjustment at program entry. It would therefore be important to control for this baseline factor when examining associations between MRQ and later adjustment. Note also that the correlations between Time 1 and Time 3 for a same adjustment indicator range from weak to moderate (r varies from .16 to .63), suggesting considerable variability in academic adjustment before and after mentoring. Furthermore, correlations between dose

Table 1. Correlations among all study variables and descriptive statistics.

	1	2	3	4	5	6	7	8	9	10	11	12	13
Time 1													
1. Mastery goals													
2. Academic self-efficacy	0.36***												
3. Academic motivation	0.22*	0.24**											
4. Perseverance intentions	0.24**	0.24**	0.35***										
Time 3													
5. Mastery goals	0.58***	0.24**	0.08	0.23**									
6. Academic self-efficacy	0.34***	0.42***	0.02	0.19*	0.51***								
7. Academic motivation	0.28**	0.24**	0.16	0.44***	0.23**	0.30***							
8. Perseverance intentions	0.17	0.41***	0.21*	0.63***	0.32***	0.31***	0.58***						
Time 2													
9. Positive bonding	0.19*	0.22*	0.18*	0.25**	0.30***	0.31***	0.48***	0.48***					
10. Goal agreement	0.19*	0.16	0.12	0.27**	0.22*	0.43***	0.33***	0.34***	0.49***				
11. Number of meetings	-0.08	0.01	-0.10	-0.04	-0.06	-0.17	0.00	0.04	0.01	-0.01			
12. Length of meetings	-0.06	0.03	0.16	0.14	0.09	0.08	*0.04	0.09	0.18*	0.13	0.17		
13. Meeting frequencies	0.08	-0.07	-0.21*	-0.02	0.07	0.07	0.03	0.10	-0.08	-0.27**	-0.26**	-0.17	
<i>M</i>	5.48	4.68	4.51	4.66	5.30	4.37	4.16	4.66	6.19	5.66	13.01	29.76	17.74
<i>SD</i>	1.13	1.16	0.63	0.69	1.38	1.16	0.82	0.72	1.03	0.87	3.82	9.52	4.14
<i>Possible range</i>	1-7	1-7	1-5	1-5	1-7	1-7	1-5	1-5	1-7	1-7	5-22	5-150	9.5-32.4

Note. Time 1 was in September, Time 2 in May, and Time 3 in June of the same academic year; M = mean; SD = standard deviation.

* $p < .05$; ** $p < .01$; *** $p < .001$.

variables (meeting number, length, and frequency) and adjustment indicators at Time 3 are null or weak (r varies from .10 to $-.17$), and none are statistically significant. Accordingly, we did not control for these variables in subsequent analyses.

Primary analyses

Changes in student mastery goal orientation and academic adjustment

Table 2 (step 2) and Table 3, 4, and 5 (step 3) present the results of multiple linear regressions. The results largely confirm hypothesis 1. The MRQ indicators significantly predict changes in feelings of academic efficacy (Table 3), academic motivation (Table 4), and perseverance intentions (Table 5). From 10% to 19% of academic adjustment variations are explained by MRQ indicators. Bonding predicts changes in motivation and perseverance intentions (see Tables 4 and 5) and Goal agreement predicts changes in feelings of efficacy (see Table 3). However, although the percentage of variance explained by the MRQ variables is significant in predicting mastery goal orientation ($\Delta R^2 = 0.04$, $p < .05$), the beta scores are not (see Table 2). In fact, the beta weight for Bonding is only marginally significant ($\beta = 0.19$, $p = .07$).

Moderating effect of student mastery goal orientation

Step 4 of the regressions presented in Tables 3, 4, and 5 tests hypothesis 3 (compensating or conditional effects

of mentoring). This hypothesis is largely confirmed. The percentage of variance explained by the unique contribution of the interaction terms is statistically significant for the three adjustment outcomes. However, the beta scores associated with the MRQ X mastery goals interaction are significant only for predicting two academic adjustment variables (motivation and perseverance intentions). More specifically, mastery goals moderate the associations between Bonding and motivation ($\beta = -3.32$, $p < .01$) and between Bonding and perseverance intentions ($\beta = -2.35$, $p < .01$). Goal agreement does not interact with mastery goals in predicting academic adjustment.

Figure 1 illustrates the two significant interactive effects generated by the regression analysis, showing that MRQ (through Bonding) positively predicts motivation and perseverance intentions, and mainly for students with weak mastery goals at program entry (i.e., at one SD below the mean, slopes are 0.45 for motivation and 0.31 for perseverance intentions; and at 2 SD below the mean, slopes are 0.76 for motivation and 0.51 for perseverance intentions). For high mastery goals at baseline, the slopes connecting Bonding to adjustment are weaker (i.e., at one SD below the mean, slopes are -0.18 for motivation and -0.09 for perseverance intentions; at 2 SD below the mean, slopes are -0.51 for motivation and -0.29 for perseverance intentions). These results indicate that MRQ wields a compensatory effect on academic adjustment for those with a low-mastery goal orientation.

Table 2. Regression analyses predicting changes in student mastery goal orientation from MRQ indicators.

Step	Variable entered	Step 1 β	Step 2 β	R^2	ΔR^2
Student mastery goal (T3)					
1	Mastery goals (T1)	0.59***	0.55***	0.34***	0.34***
2	Positive bonding (T2)		0.19	0.38***	0.04*
	Goal agreement (T2)		0.00		

Note. Time 1 (T1) was in September, Time 2 (T2) in May, and Time 3 (T3) in June of the same academic year.

* $p < .05$; ** $p < .01$; *** $p < .001$.

Mediating effect of student mastery goal orientation

Table 6 presents the mediation analysis results. First, the tests of direct effects confirm what we reported above: Bonding acts on motivation and perseverance intentions, whereas Goal agreement predicts feelings of academic efficacy. More importantly, the indirect effects reveal nonsignificant confidence intervals and p values, indicating that mastery goals do not mediate the predictive association between teacher–student MRQ and academic adjustment.

Table 3. Regression analyses predicting changes in student academic self-efficacy from MRQ indicators and student mastery goal orientation.

Step	Variable entered	Step 1 β	Step 2 β	Step 3 β	Step 4 β	R^2	ΔR^2
Academic self-efficacy (T3)							
1	Academic self-efficacy (T1)	0.42***	0.34***	0.30***	0.32***	0.18**	0.18**
2	Mastery goal (T1)		0.23*	0.17	1.59	0.23**	0.05***
3	Positive bonding (T2)			0.08	0.10	0.33***	0.10***
	Goal agreement (T2)			0.28*	1.30*		
4	Bonding x mastery goal				-0.11	0.36***	0.03*
	Agreement x mastery goal				-1.86		

Note. Time 1 (T1) was in September, Time 2 (T2) in May, and Time 3 (T3) in June of the same academic year.

* $p < .05$; ** $p < .01$; *** $p < .001$.

Table 4. Regression analyses predicting changes in student academic motivation from MRQ indicators and student mastery goal orientation.

Step	Variable entered	Step 1 β	Step 2 β	Step 3 β	Step 4 β	R ²	ΔR^2
Academic motivation (T3)							
1	Academic motivation (T1)	0.14	0.08	0.04	0.10	0.02	0.02
2	Mastery goals (T1)		0.26*	0.18	2.22**	0.08	0.06***
3	Positive bonding (T2)			0.41***	2.09***	0.27**	0.19***
	Goal agreement (T2)		0.07	–	0.23		
4	Bonding x mastery goals			–	3.32**	0.35***	0.08***
	Agreement x mastery goals				0.65		

Note. Time 1 (T1) was in September, Time 2 (T2) in May, and Time 3 (T3) in June of the same academic year.

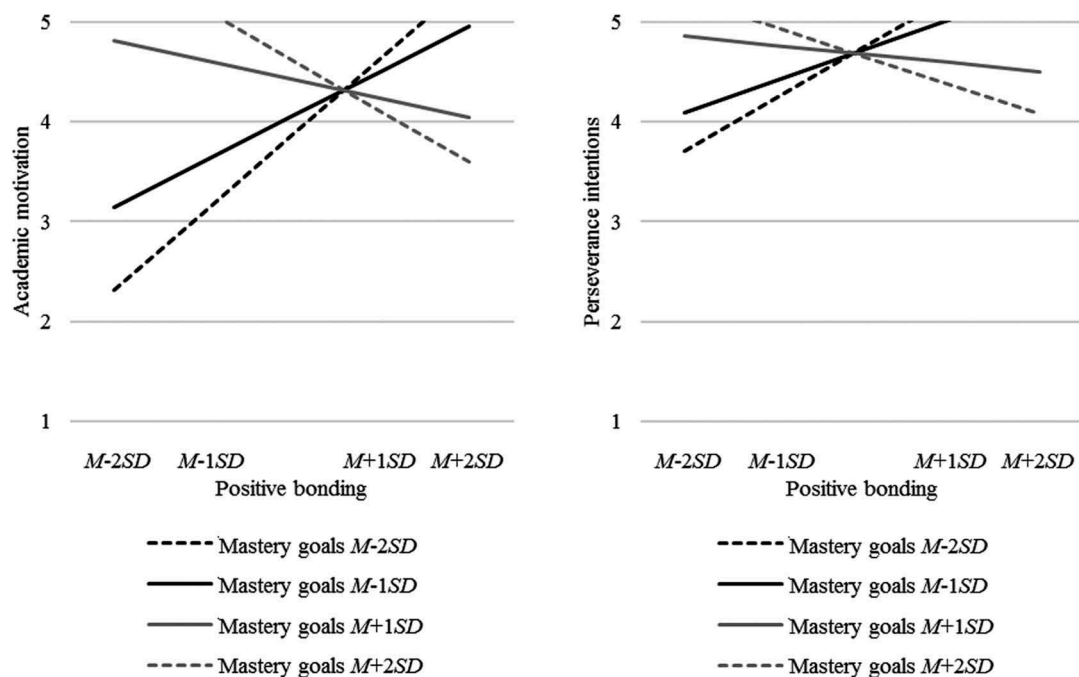
* $p < .05$; ** $p < .01$; *** $p < .001$.

Table 5. Regression analyses predicting changes in student perseverance intentions from MRQ indicators and student mastery goal orientation.

Step	Variable entered	Step 1 β	Step 2 β	Step 3 β	Step 4 β	R ²	ΔR^2
Perseverance intentions (T3)							
1	Perseverance intentions (T1)	0.61***	0.62***	0.56***	0.54***	0.38***	0.38***
2	Mastery goals (T1)		-0.03	-0.08	2.29**	0.38***	0.00
3	Positive bonding (T2)			-0.36***	1.53**	0.50***	0.12***
	Goal agreement (T2)			-0.00	0.48		
4	Bonding x mastery goals			–	2.35*	0.56***	0.06***
	Agreement x mastery goals			–	0.80		

Note. Time 1 (T1) was in September, Time 2 (T2) in May, and Time 3 (T3) in June of the same academic year.

* $p < .05$; ** $p < .01$; *** $p < .001$.



a. Academic motivation : Bonding x mastery goals

b. Perseverance intentions: Bonding x mastery goals

Figure 1. Interaction effects found between mastery goal orientation and bonding with mentors in predicting youth academic adjustment.

Note. $M-2SD$ = 2 standard deviations below the mean; $M-1SD$ = 1 standard deviation below the mean; $M + 1SD$ = 1 standard deviation above the mean; $M + 2SD$ = 2 standard deviations above the mean.

Discussion

In this study, we proposed that the quality of mentoring that mentees received under the ACCES program would predict positive changes in their academic

adjustment during the transition from elementary to high school (hypothesis 1). The results largely confirm this first hypothesis. The Bonding dimension of MRQ predicted positive changes in mentee motivation and their intentions to persevere in school, and the Goal

Table 6. Indirect effects linking MRQ (i.e., Bonding and Goal agreement), mastery goal orientation, and academic adjustment.

Models (A → B → C)	Fit statistics			Directs effects (β)			Indirect effects	
	CFI	RMSEA (CI _{90%})	χ ²	A → B	B → C	A → C	p	CI _{95%}
Bonding → Mastery goals → Academic self-efficacy	1.00	.000 (.000 to .064)	.16	.19	.41***	.10	.14	-.03 to .18
Bonding → Mastery goals → Academic motivation	.986	.059 (.000 to .204)	2.81	.19	.08	.46*	.54	-.03 to .07
Bonding → Mastery goals → Perseverance intentions	.986	.071 (.000 to .212)	3.17	.20	.07	.33*	.52	-.03 to .05
Agreement → Mastery goals → Academic self-efficacy	1.00	.000 (.000 to .128)	.59	.09	.39***	.28*	.36	-.04 to .11
Agreement → Mastery goals → Academic motivation	1.00	.000 (.000 to .176)	1.70	.09	.18	.24	.53	-.04 to .07
Agreement → Mastery goals → Perseverance intentions	.973	.092 (.000 to .227)	3.95	.09	.16	.11	.47	-.02 to .05

p* < .05; *p* < .01; ****p* < .001.

agreement dimension predicted positive changes in their feelings of academic efficacy. Bonding was also marginally associated with mentee mastery goals at program end. These results concur with a growing number of studies that have found positive associations between formal mentoring by high school teachers and academic adjustment in at-risk students (Fruiht & Wray-Lake, 2013; Gastic & Johnson, 2009; Holt et al., 2008). They also extend the premises of the main youth mentoring models to teacher–student mentoring: that a mentoring relationship with a teacher, characterized by empathy, mutuality, and trust, predicts academic success and well-being in mentored students (Larose & Tarabulsky, 2014; Rhodes, 2005).

In connection with Hypothesis 1, note that Bonding predicted motivation and perseverance intentions, whereas Goal agreement acted to encourage feelings of academic efficacy during the transition. These results suggest that both these components of the mentoring relationship are important for preventing adjustment problems in academically at-risk students during the transition. Consistent with the premises of the socio-motivational mentoring model (Larose & Tarabulsky, 2014), this suggests that the quality of the bonding developed in the relationship with the teacher-mentor could meet the mentee's need for social connection, which would indirectly influence the student to like and value school more (academic motivation) and to persevere at school. In a complementary fashion, a clear and common understanding of the mentoring goals to pursue would provide mentees with an explicit structure that would help meet their need for feelings of competence during the transition (Larose & Tarabulsky, 2014). This mutual agreement on the expectations and requirements for the roles of mentee and student would help them feel more competent, and hence encourage autonomous behaviors. The results for hypothesis 1 emphasize the multidimensional nature of the academic mentoring relationship (Nakkula & Harris, 2014), suggesting that the effects on academic adjustment are explained by both relational components (bonding) and structural components (common goals; Larose & Tarabulsky, 2014; Nakkula & Harris, 2014).

We also proposed that changes in mentees' mastery goals from start to end of the ACCES program would mediate the predictive association between MRQ and academic adjustment. This second hypothesis was partly motivated by one of the premises of the model of youth mentoring (Rhodes, 2005): that the quality of the mentoring relationship can enrich academic adjustment in youth through the development of certain cognitive and motivational processes. Our results show a marginal predictive association between MRQ and changes in mastery goals for our ACCES students, but no indirect effect of mentoring on academic adjustment.

It is possible that the length and frequency of the ACCES mentoring meetings limited our exploration of the mediating effects. For instance, the cognitive processes identified by Rhodes (2005) may intervene only in longer, more comprehensive mentoring programs. The ACCES program aims to increase students' mastery goal orientation during the first year to high school. In this case, the average of 13 meetings over the school year may have been insufficient to bring about the desired changes. Furthermore, given that our academic adjustment indicators (i.e., feelings of efficacy, academic motivation, and perseverance intentions) were closely related to the classroom experience, certain classroom environment factors could have interfered with the development of mastery goals (Anderman & Patrick, 2012). For example, a performance-oriented environment in some classrooms could have limited the mentors' efforts to foster mastery goals. It is also possible that mastery goal orientation does not mediate at all the association between MRQ and academic adjustment. The mediation may perhaps operate through other pathways, such as increased trust and confidence in teachers in general (socioemotional processes) or the mentee's progressive internalization of the mentor's values, attitudes, and behaviors (identification processes; Rhodes, 2005).

Whatever the explanations for the lack of mediating effect, future studies could systematically examine potential mediators of mentoring effects on youth adjustment (Laco & Johnson, 2017). The more we

know about the underlying mechanisms, the better prepared we will be to improve mentor training and supervision, along with the quality and effectiveness of mentoring programs (DuBois & Rhodes, 2006; Garringer, Kupersmidt, Rhodes, Stelter, & Tai, 2015).

We stated as a third hypothesis that the mastery goals of academically at-risk students at entry into the ACCES program would moderate the association between MRQ and academic adjustment during the transition from elementary to high school. Our results largely confirmed this hypothesis. Specifically, we found predictive associations between the bonding dimension of the mentoring relationship and motivation and between bonding and intentions to persevere in school, and these associations were stronger when mentees had weak mastery goals at program entry. This suggests that MRQ wields a compensatory effect on both dimensions of academic adjustment (motivation and perseverance intentions). Thus, the most at-risk students in terms of motivation (those with weaker mastery goal orientation at program entry) would be encouraged through mentoring to like and value school more, and hence to persevere in their learning throughout the transition. This compensatory effect is consistent with one of the premises of the sociomotivational mentoring model (Larose & Tarabulsy, 2014), whereby certain of the mentee's cognitive and motivational characteristics can either strengthen or weaken the effects of mentoring on academic adjustment. It is also consistent with the overall aim of the initial ACCES training: to deepen teacher-mentors' understanding of student mastery goals and how to integrate this knowledge into their mentoring practices (Boisclair Châteauvert et al., 2014).

This demonstration of a compensatory effect of academic mentoring enriches and clarifies the knowledge of the mechanisms at play in mentoring academically at-risk students. To date, studies that have explored the moderating effect of being academically at-risk on the impact of mentoring have yielded largely mixed results. Some studies have shown stronger effects for higher-risk students (i.e., with low GPA, high school absence rates, feelings of being disconnected from school; Karcher, Davidson, Rhodes, & Herrera, 2010; Rodríguez-Planas, 2009; Whiting & Mallory, 2007), whereas others have found weaker effects for the same student category, particularly when the risk was defined as receiving (or not) "special education" (Morrow-Howell, Jonson-Reid, McCrary, Lee, & Spitznagel, 2009). The results of our study suggest that a positive mentoring relationship might compensate for the potentially negative effects of weak mastery goal orientation in academically at-risk students. Through the

development of relationships of trust and security with teacher-mentors, these students could develop social goals that would raise their awareness of the relevance and usefulness of various learning behaviors (e.g., seeking help from teachers, trusting school staff, seeking help from teachers and peers). These "social" goals could compensate for weak mastery goals, thus enabling at-risk students to sustain their motivation and persevere in their studies (Makara & Madjar, 2015).

Strengths and limitations

Our study was innovative in several respects. We used a prospective research design to predict changes in academic adjustment in academically at-risk students during the transition from elementary to high school. We considered the multidimensional nature of the mentoring relationship by assessing bonding between the mentor and mentee as well as their agreement on common goals to pursue. We examined the initial implementation year of a new mentoring program in which teachers acted as mentors to academically at-risk students. All this contributes to enrich the knowledge in an intervention area that has been understudied to date.

Despite these strengths, however, this study includes certain limitations. First, although we controlled for baseline academic adjustment in the prediction of academic adjustment after the mentoring experience, we assessed mentees' perceptions of the MRQ closely from postexperience adjustment (i.e., one-month interval). It is therefore possible that the postexperience adjustment had influenced students' perceptions of their mentoring relationship, and the results should be interpreted with caution. Second, we focused on one mentoring program (ACCES). This limits the generalization of the direct and indirect compensatory effects of mentoring on academic adjustment to similar programs during the elementary-to-high school transition. Third, we based our findings on the mentee's viewpoint. It would be instructive to consider the mentor's viewpoint in future assessments of MRQ, as well as the teacher's appraisal of the academic adjustment of at-risk students. Data on academic perseverance beyond first-year high school could also expand the appreciation of how academic mentoring relationships help prevent school dropout.

Implications for practice and future research

The results of this study have significant implications for academic mentoring practices. First, they indicate that volunteer teacher mentors can make a substantial difference in the academic pathways of academically at-risk

students who are entering high school. High schools are advised to invest in similar interventions with proven mentoring practices. We should keep in mind that the ACCES program is based on a number of evidence-based practices (Garringer et al., 2015): (a) exhaustive initial training for mentors that stresses the importance of a positive working alliance between mentor and mentee (i.e., bonding and goal agreement) combined with an intervention culture that emphasizes mastery of learning skills by mentees (i.e., the TARGETS model); (b) regular supervision (individual and group) by an experienced mentor throughout the program; (c) use of logbooks to structure the teacher-mentor approach and ensure alignment with intervention principles; (d) regular meetings between mentor and mentee (1 per 9-day cycle) beginning in September and spread out over the first high school year. We believe that adherence to these evidence-based practices made the ACCES program more effective and preventive during the elementary–high school transition.

Furthermore, our demonstration of the compensatory effect of mentoring confirms the value of this intervention type for the most at-risk students. Too often, academic support interventions work best with less deprived students, so that they end up benefiting the ones who are already better off. Consequently, they fail to prevent “complex” social problems such as school dropout. The compensatory effect of mentoring that we found suggests that the ACCES program could help prevent adjustment problems in the most disadvantaged at-risk students by boosting their competence and motivation. It is therefore a promising tool to help prevent school dropout.

The findings of our study also have implications for research and theory in the field of student achievement goal (Anderman & Patrick, 2012). To date, this research and theory have mainly focused on documenting the nature of achievement goals, as well as their determinants and effects during adolescent development. To our knowledge, very few studies have explored the role of student mastery goals in the context of prevention programs. The results of our study suggest that mentoring relationships with teachers, developed in the context of a prevention program, can reinforce the mastery goals of at-risk students. They also suggest that this type of mentoring can attenuate the negative effects of low mastery goals on the student’s academic adjustment. We believe that a good knowledge of the principles of the achievement goal theory could help teacher-mentors to better understand the motivations of their mentored students. We also believe that it could enable teacher-mentors to display teaching practices that will reinforce the development of mastery goals in students and help them persevere and succeed.

Conclusion

In conclusion, our study showed that, when voluntary high school teachers in the ACCES program provide good-quality mentoring, they can help prevent the development of academic adjustment problems during the transition from elementary to high school, and particularly in academically at-risk students with low motivation. It would be informative in future studies to assess the mid- and long-term effects of this type of mentoring relationship on student academic achievement and perseverance, to document its impacts also on the mentor-teachers and other students in their classes that were not mentored, and to further explore the underlying mechanisms (mediators and moderators) of these effects.

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